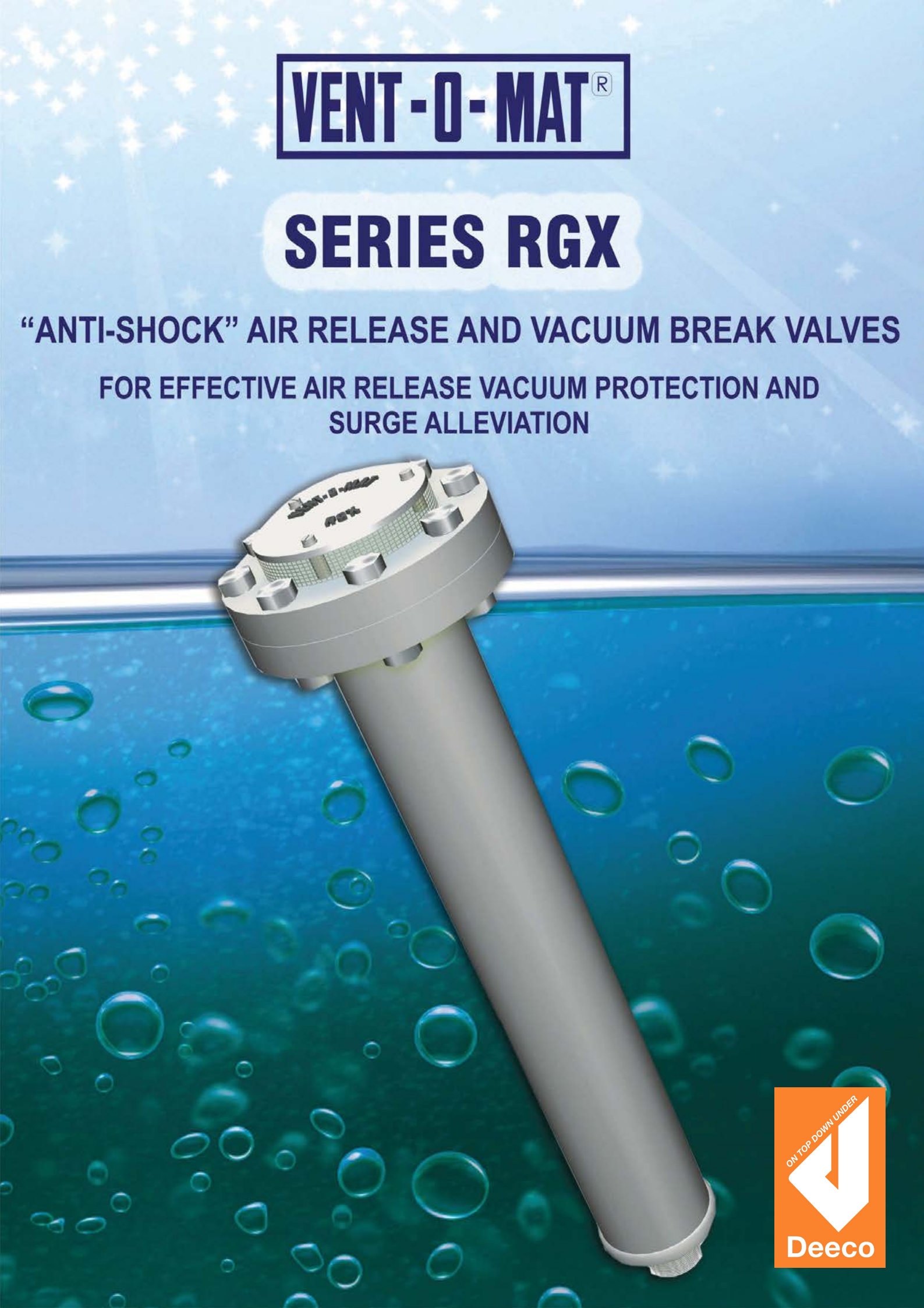
VENT-O-MAT®

SERIES RGX

"ANTI-SHOCK" AIR RELEASE AND VACUUM BREAK VALVES

FOR EFFECTIVE AIR RELEASE VACUUM PROTECTION AND SURGE ALLEVIATION



ON TOP DOWN UNDER

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VENT-O-MAT®

Series RGX

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION

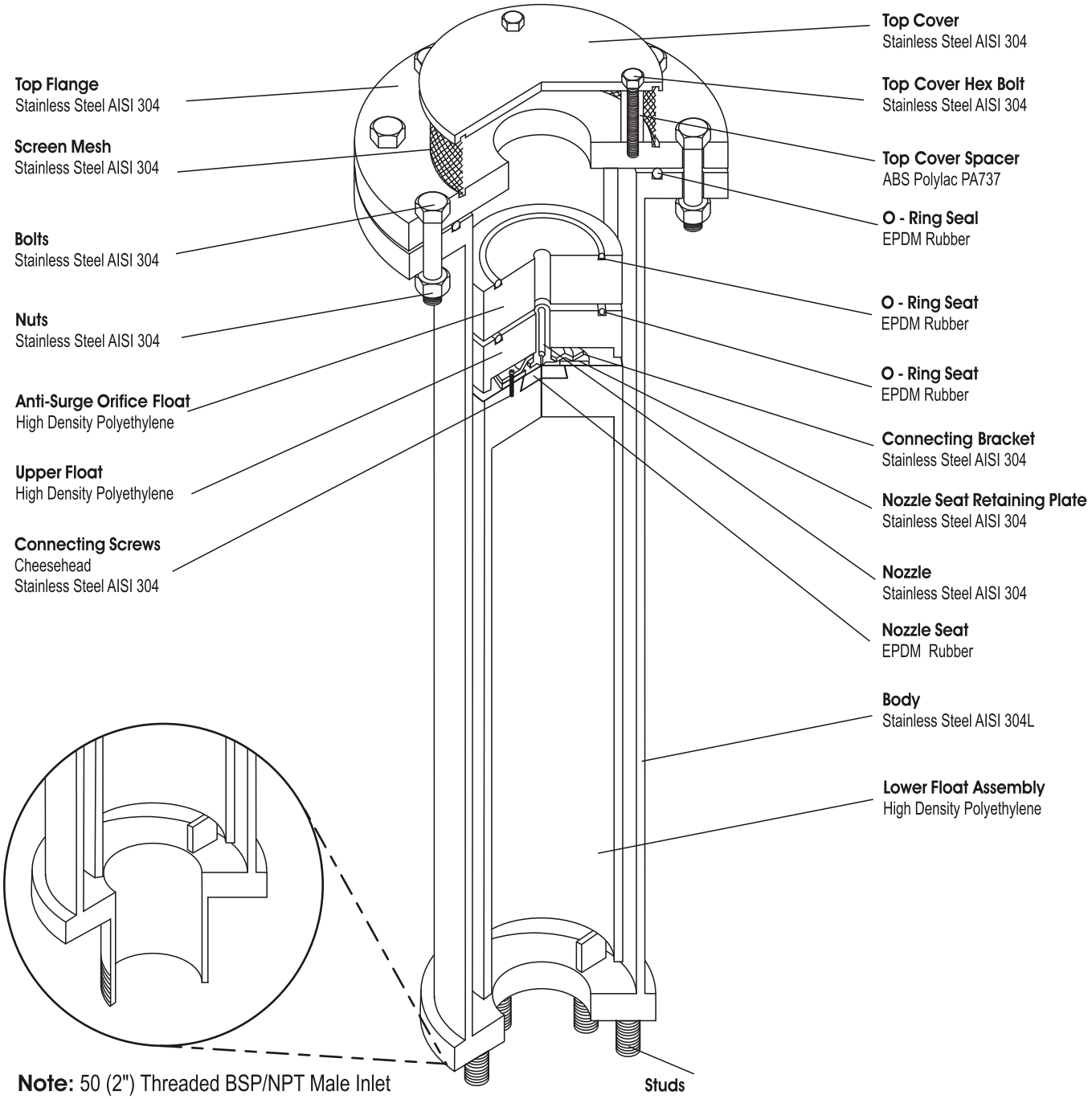
THREADED 50 (2") & STUDDED INLET - 80 (3") TO 100 (4")

Type:
Series RGX - Double Orifice (Small & Large Orifice) with "Anti-Surge" Mechanism.

End Connection:
Flange with Threaded BSP/NPT Male - 50 (2") valves.
Flange with Screwed Studs - 80 (3") & 100 (4") valves.

Nominal Sizes:
DN50 (2")
DN80 (3")
DN100 (4")

Model No:	Pressure Ratings:
RGX 1011/1021	PN10 (145 psi)
RGX 1001/1031	PN10 (145 psi)



Note: 50 (2") Threaded BSP/NPT Male Inlet Valves are available in AISI 316L on request.

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VENT-O-MAT®

Series RGX

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION

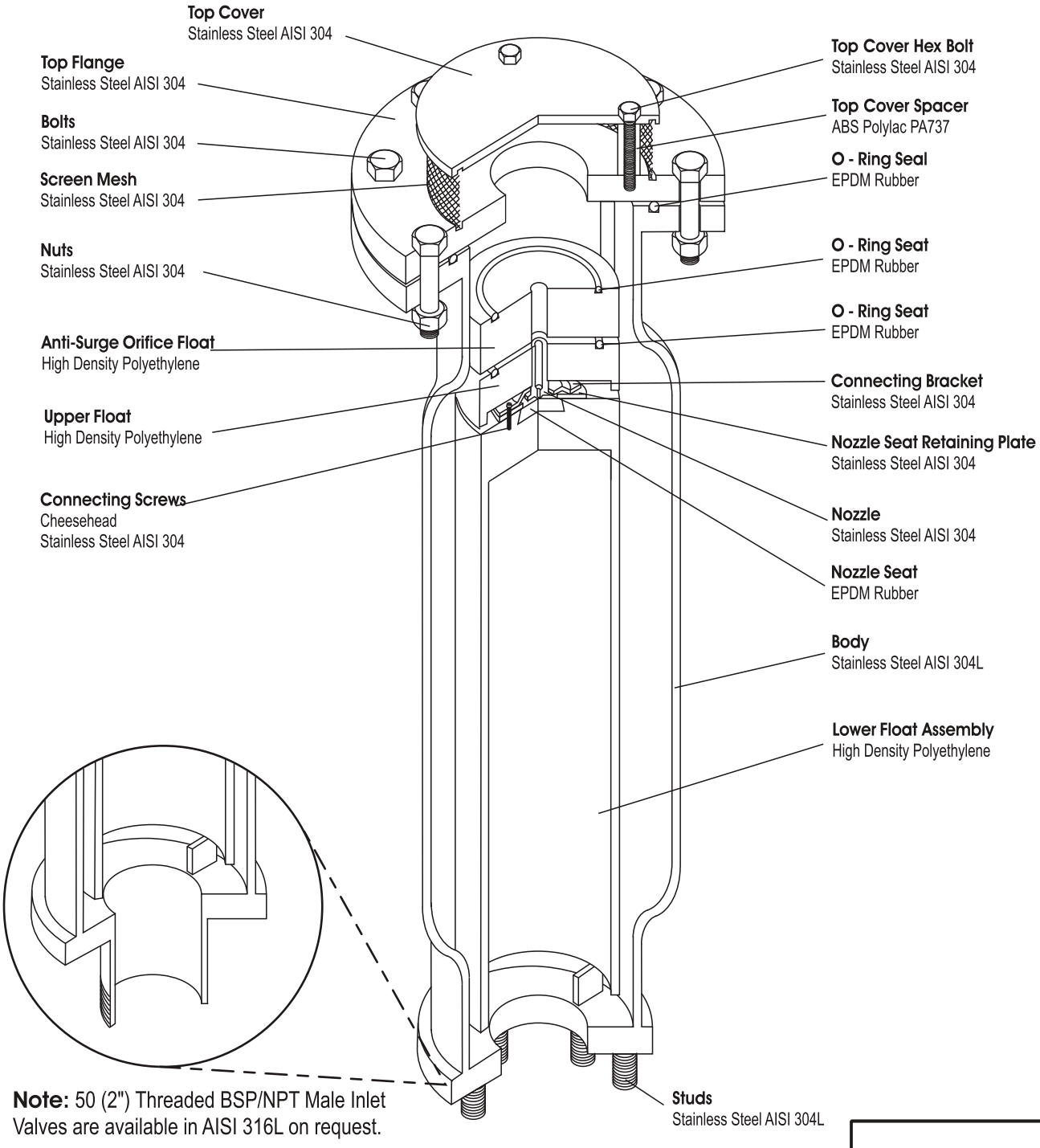
THREADED 50 (2") & STUDDED INLET - 80 (3") TO 100 (4") EXPANDED BODY

Type:
Series RGX - Double Orifice (Small & Large Orifice) with "Anti-Surge" Mechanism.

End Connection:
Flange with Threaded BSP/NPT Male 50 (2") valves.
Flange with Screwed Studs 80 (3") & 100 (4") valves.

Nominal Sizes:
DN50 (2")
DN80 (3")
DN100 (4")

Model No's:	Pressure Ratings:
RGX 1611/1621	PN16 (232 psi)
RGX 2511/2521	PN25 (363 psi)
RGX 1601/1631	PN16 (232 psi)
RGX 2501/2531	PN25 (363 psi)



Note: 50 (2") Threaded BSP/NPT Male Inlet Valves are available in AISI 316L on request.

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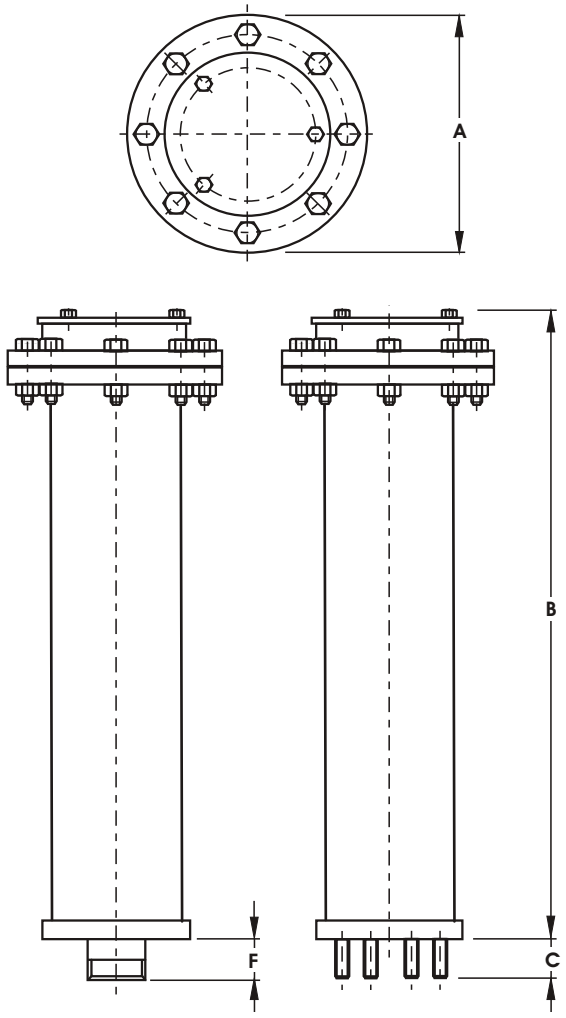
VENT-O-MAT®

Series RGX

GENERAL SPECIFICATIONS

THREADED 50 (2") & STUDDED INLET - 80 (3") TO 200 (8")



Type:
Double Orifice (Small & Large Orifice) with Anti Surge Orifice mechanism.

End Connection:
Flange with DN50 (2") Male BSP/NPT Threaded and Screwed Studs for Alignment to BS4504, SABS 1123 and ANSI B16.5 Class 150 for DN80 (3") to DN200 (8").

Nominal Sizes:
DN50 (2"), DN80 (3"), DN100 (4"), DN150 (6") & DN200 (8")

Model No's:	**Pressure Ratings bar (psi):**
RGX 1011/1021	PN10 (145 psi)
RGX 1001/1031	PN10 (145 psi)

Operating Pressure Range - bar (psi):

	Min	Max.
PN10 (145 psi)	0.5 (7.2)	10 (145)

Function:
i) High volume air/gas discharge - pipeline filling.
ii) High volume air intake - pipeline draining
iii) Pressurized air/gas discharge - pipeline filled.
iv) Surge dampening - high velocity air/gas discharge, liquid column separation & liquid oscillation.

Valve Selection:- see pages 11 & 12

Materials of Construction:- see pages 5 & 7

Installation:- see page 3

Standard Factory Tests:
i) Hydrostatic test -1.5 x max. rated working pressure
ii) Low head leak test - 0.5 bar (7.2 psi)
iii) Small orifice function test at max. rated working pressure (minimum 1 valve in 10).

OVERALL DIMENSIONS & WEIGHTS

DN mm	DN in	Model No.	A mm	A in	B mm	B in	C mm	C in	D mm	D in	E mm	E in	F mm	F in	Weight kg	Weight lbs
50	2	050 RGX 1011/1021	220	8 2/3	770	30 3/8	N/A		125	5	50	2	42	1 2/3	18	39.7
80	3	080 RGX 1001/1031	285	11 ¼	780	30 7/10	55	2 1/8	200	7 7/8	80	3	N/A		36.5	80.5
100	4	100 RGX 1001/1031	285	11 ¼	780	30 7/10	55	2 1/8	220	8 2/3	100	4	N/A		36	79.4
150	6	150 RGX 1001/1031	395	15 9/16	1060	41 7/10	55	2 1/8	285	11	150	6	N/A		82	180.8
200	8	200 RGX 1001/1031	445	17 ½	1060	41 7/10	55	2 1/8	340	13 6/16	200	8	N/A		103	227

Note: DN50 (2") valves have DN50 (2") BSP/NPT male inlet connections as standard.

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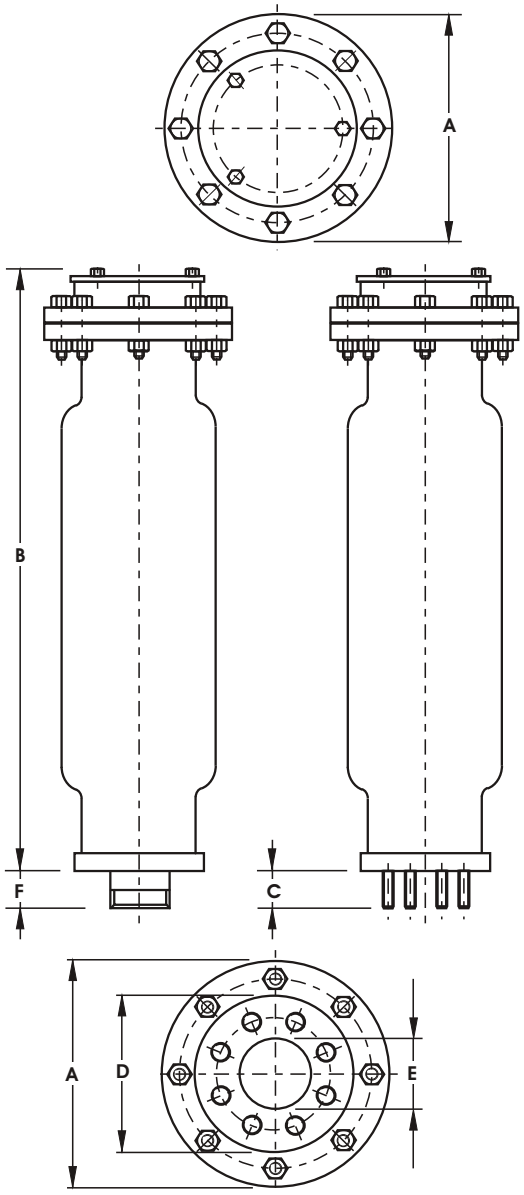
VENT-O-MAT®

Series RGX

GENERAL SPECIFICATIONS

THREADED 50 (2") & FLANGED - 50 (2") TO 200 (8") EXPANDED BODY



Type:
Double Orifice (Small & Large Orifice) with Anti Surge Orifice mechanism.

End Connection:
Flange with DN50 (2") Male BSP/NPT Threaded and Screwed Studs for Alignment to BS4504, SABS1123 and ANSI B16.1 Class 150 & Class 300 for DN80 (3") to DN200 (8").

Nominal Sizes:
DN50 (2"), DN80 (3"), DN100 (4"), DN150 (6") & DN200 (8")

Model No's:	Pressure Ratings bar (psi):
RGX 1611/1631	PN16 (232 psi) ANSI #125
RGX 1601/1631	PN16 (232 psi) ANSI #125
RGX 2501/2531	PN25 (363 psi) ANSI #250

Operating Pressure Range - bar (psi):

	Min	Max.
PN16 (232 psi) ANSI #125	0.5 (7.2)	16 (232)
PN25 (363 psi) ANSI #250	0.5 (7.2)	16 (363)

Function:
i) High volume air/gas discharge - pipeline filling.
ii) High volume air intake - pipeline draining
iii) Pressurized air/gas discharge - pipeline filled.
iv) Surge dampening - high velocity air/gas discharge, liquid column separation & liquid oscillation.

Valve Selection:- see pages 11 & 12

Materials of Construction:- see pages 6 & 8

Installation:- see page 3

Standard Factory Tests:
i) Hydrostatic test -1.5 x max. rated working pressure
ii) Low head leak test - 0.5 bar (7.2 psi)
iii) Small orifice function test at max. rated working pressure (minimum 1 valve in 10).

OVERALL DIMENSIONS & WEIGHTS

DN		Model No.	A		B		C		D		E		F		Weight	
mm	in		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lbs
50	2	050 RGX 1611 & 1621	220	8 2/3	770	30 3/8	N/A		125	5	50	2	42	1 2/3	21	46.3
80	3	080 RGX 1601 & 1631	285	11 ¼	780	30 7/10	55	2 1/8	200	7 7/8	80	3	N/A		37.5	82.67
100	4	100 RGX 1601 & 1631	285	11 ¼	780	30 7/10	55	2 1/8	220	8 2/3	100	4	N/A		37	81.57
150	6	150 RGX 1601 & 1631	395	15 9/16	1060	41 7/10	55	2 1/8	285	11	150	6	N/A		84.5	186.3
200	8	200 RGX 1601 & 1631	445	17 ½	1060	41 7/10	55	2 1/8	340	13 6/16	200	8	N/A		105.5	232.6
50	2	050 RGX 2511 & 2521	220	8 2/3	770	30 3/8	N/A		125	5	50	2	42	1 2/3	21	46.3
80	3	080 RGX 2501 & 2531	285	11 ¼	780	30 7/10	55	2 1/8	200	7 7/8	80	3	N/A		37.5	82.67
100	4	100 RGX 2501 & 2531	285	11 ¼	780	30 7/10	55	2 1/8	220	8 2/3	100	4	N/A		37	81.57
150	6	150 RGX 2501 & 2531	395	15 9/16	1060	41 7/10	55	2 1/8	285	11	150	6	N/A		84.5	186.3
200	8	200 RGX 2501 & 2531	445	17 ½	1060	41 7/10	55	2 1/8	340	13 6/16	200	8	N/A		105.5	232.6

Note: DN50 (2") valves have DN50 (2") BSP/NPT male inlet connections as standard.

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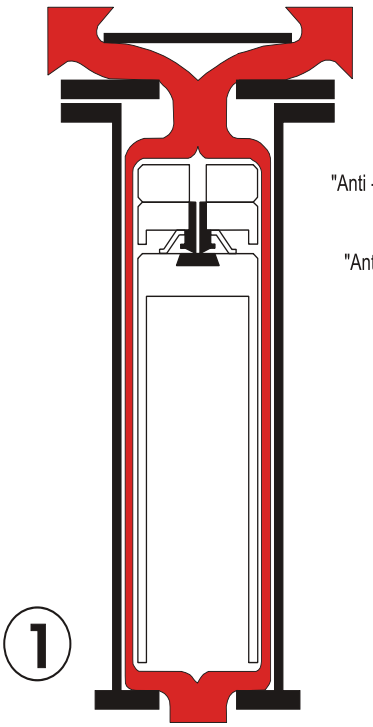
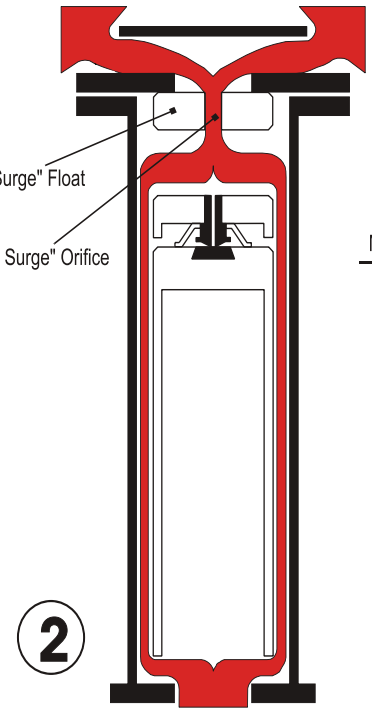
VENT-O-MAT®

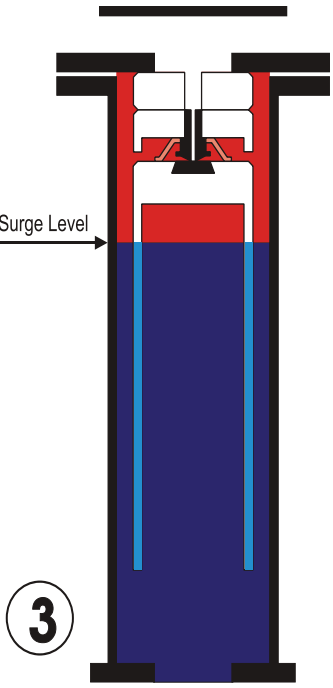
Series RGX
OPERATION



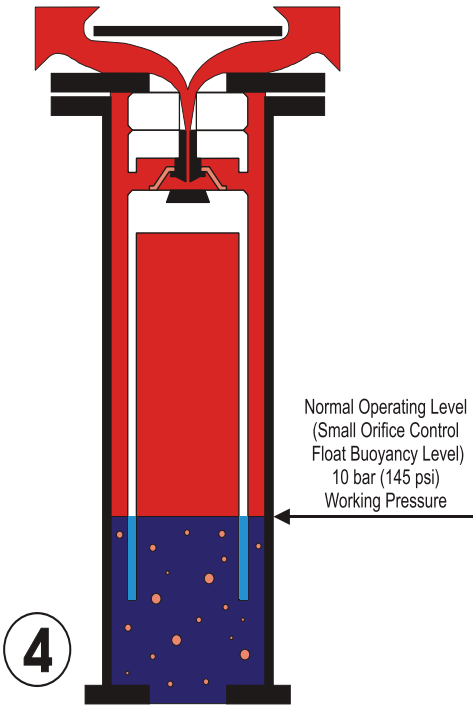
PIPELINE FILLING
(SUB CRITICAL SEWAGE/ EFFLUENT
APPROACH VELOCITY)



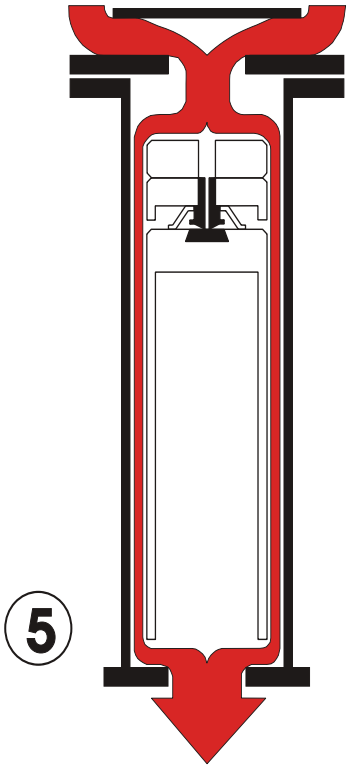
PIPELINE FILLING
(EXCESSIVE SEWAGE/ EFFLUENT
APPROACH VELOCITY)



PIPELINE FULLY CHARGED



PRESSURIZED AIR/GAS RELEASE
PIPELINE OPERATING



VACUUM RELIEF (AIR INTAKE)
PIPELINE DRAINING

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VENT-O-MAT®

Series RGX

OPERATION

PRE NOTES:

A) VENTING OF A FILLING PIPELINE:

The operation of a conventional sewage air release valve is such that fast approaching sewage/effluent is almost instantaneously halted by the valve's closure. Consequently a transient pressure rise or shock of potentially damaging proportions can be generated in a pipeline system, even at normal filling rates.

In addition to venting through the Large Orifice when sewage/ effluent approach velocities are sub critical, the Vent -O- Mat series RGX sewage air release valves feature an automatic "Anti - Surge" Orifice device that serves to decelerate sewage/ effluent approaching at excessive speed, thereby limiting pressure rise in the pipeline.

B) SURGE ALLEVIATION - PIPELINE PRESSURIZED:

In instances where a pipeline experiences liquid column separation due to pump stoppage, high shock pressures can be generated when the separated column rejoins.

The Vent -O- Mat series RGX takes in air through the unobstructed large orifice when column separation occurs, but controls the discharge of air/gas through the "Anti-Surge" Orifice as the separated column commences to rejoin. The rejoining impact velocity is thereby sufficiently reduced to prevent an unacceptably high surge pressure in the system. In the same way the series RGX valve prevents high surge pressures resulting from liquid oscillation in a pipeline.

1. PIPELINE FILLING (SUB CRITICAL SEWAGE/ EFFLUENT APPROACH VELOCITY)

Air/gas flows through the annular area around the control float assembly and to atmosphere through the large orifice.

2. PIPELINE FILLING (EXCESSIVE SEWAGE/ EFFLUENT APPROACH VELOCITY)

In reaction to an increase in air/gas flow, the "Anti - Surge" float closes the large orifice and air/gas is forced through the "Anti - Surge" Orifice resulting in a deceleration of the approaching liquid due to the resistance of rising air/gas pressure in the valve.
Attention is drawn to Pre Notes (A) and (B) above.

3. PIPELINE FULLY CHARGED

Sewage/effluent has entered the the valve chamber and buoyed the floats to close both the large and the small orifice. The design's compression/ volume relationship prevents the media from ever exceeding the maximum surge level indicated in diagram 3. The resultant sewage/ effluent free area protects against the fouling of the orifice seals by solids or high viscous substances - for this reason **NO FLUSHING CONNECTIONS ARE NECESSARY.**

4. PRESSURIZED AIR/ GAS RELEASE - PIPELINE OPERATING

The volume of disentrained air/gas increases in the valve and displaces the sewage/effluent to the lower, normal operating level (small orifice control float buoyancy level). Any additional lowering of the sewage/effluent level, as would occur when more air/gas enters the valve, will result in the control float dropping away from the small orifice through which pressurized air/gas is then being discharged to atmosphere.

The control float will close the small orifice when sufficient air/gas has been released to restore the sewage effluent to the normal operating level.
The considerable sewage/effluent free area obviates the possibility of leaks that could otherwise be caused by solids entering the sealing areas - for this reason **NO FLUSHING CONNECTIONS ARE NECESSARY.**

5. VACUUM RELIEF (AIR INTAKE) - PIPELINE DRAINING

When the internal pipeline pressure reduces to atmosphere the "Anti - Surge " mechanism and control float assembly drops, opens the large orifice and allows the pipeline to take in air to displace the draining media so as to prevent undesirable low negative pressure*.The hollow, smooth side float design discourages adherence of solids and viscous substances which, therefore, tend to withdraw from the valve into the pipeline when draining occurs - for this reason **NO FLUSHING CONNECTIONS ARE NECESSARY.**

***NOTE:** Negative pressure values are dependant on valve size selection.

VENT-O-MAT®

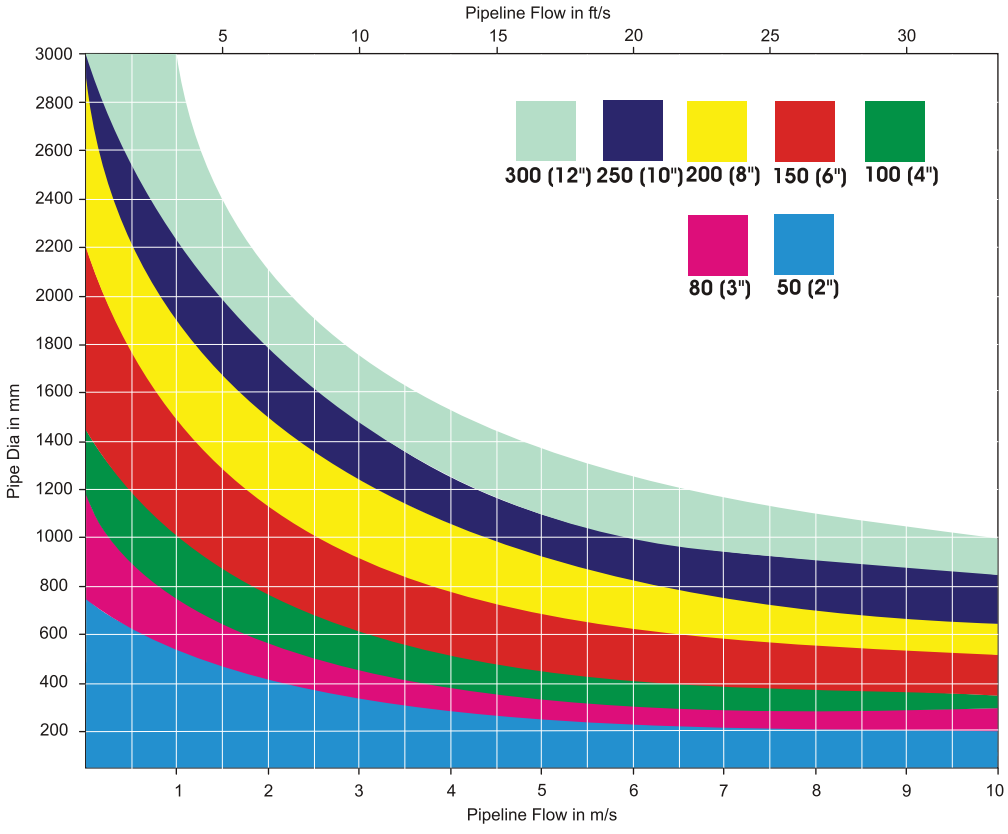
Series RGX

SELECTION & POSITIONING

Conversion Table: - l/min. to m/sec. of Pipeline Velocity

Pipe Dia	Pipeline Velocity in Metres per sec																			
mm	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
100	4	8	12	16	20	24	27	31	35	39	43	47	51	55	59	63	67	71	75	79
150	9	18	27	35	44	53	62	71	80	88	97	106	115	124	133	141	150	159	168	177
200	16	31	47	63	79	94	110	126	141	157	173	188	204	220	236	251	267	283	298	314
250	25	49	74	98	123	147	172	196	221	245	270	295	319	344	368	393	417	442	466	491
300	35	71	106	141	177	212	247	283	318	353	389	424	459	495	530	565	601	636	672	707
350	48	96	144	192	241	289	337	385	433	481	529	577	625	673	722	770	818	866	914	962
400	63	126	188	251	314	377	440	503	565	628	691	754	817	880	942	1005	1068	1131	1194	1257
450	80	159	239	318	398	477	557	636	716	795	875	954	1034	1113	1193	1272	1352	1431	1511	1590
500	98	196	295	393	491	589	687	785	884	982	1080	1178	1276	1374	1473	1571	1669	1767	1865	1963
550	119	238	356	475	594	713	832	950	1069	1188	1307	1425	1544	1663	1782	1901	2019	2138	2257	2376
600	141	283	424	565	707	848	990	1131	1272	1414	1555	1696	1838	1979	2121	2262	2403	2545	2686	2827
650	166	332	498	664	830	995	1161	1327	1493	1659	1825	1991	2157	2323	2489	2655	2821	2986	3152	3318
700	192	385	577	770	962	1155	1347	1539	1732	1924	2117	2309	2501	2694	2886	3079	3271	3464	3656	3848
750	221	442	663	884	1104	1325	1546	1767	1988	2209	2430	2651	2872	3093	3313	3534	3755	3976	4197	4418
800	251	503	754	1005	1257	1508	1759	2011	2262	2513	2765	3016	3267	3519	3770	4021	4273	4524	4775	5027
850	284	567	851	1135	1419	1702	1986	2270	2554	2837	3121	3405	3688	3972	4256	4540	4823	5107	5391	5675
900	318	636	954	1272	1590	1909	2227	2545	2863	3181	3499	3817	4135	4453	4771	5089	5407	5726	6044	6362
950	354	709	1063	1418	1772	2126	2481	2835	3190	3544	3899	4253	4607	4962	5316	5671	6025	6379	6734	7088
1000	393	785	1178	1571	1963	2356	2749	3142	3534	3927	4320	4712	5105	5498	5890	6283	6676	7069	7461	7854
1100	475	950	1425	1901	2376	2851	3326	3801	4276	4752	5227	5702	6177	6652	7127	7603	8078	8553	9028	9503
1200	565	1131	1696	2262	2827	3393	3958	4524	5089	5655	6220	6786	7351	7917	8482	9048	9613	10179	10744	11310
1300	664	1327	1991	2655	3318	3982	4646	5309	5973	6637	7300	7964	8628	9291	9955	10619	11282	11946	12610	13273
1400	770	1539	2309	3079	3848	4618	5388	6158	6927	7697	8467	9236	10006	10776	11545	12315	13085	13854	14624	15394
1500	884	1767	2651	3534	4418	5301	6185	7069	7952	8836	9719	10603	11486	12370	13254	14137	15021	15904	16788	17671
1600	1005	2011	3016	4021	5027	6032	7037	8042	9048	10053	11058	12064	13069	14074	15080	16085	17090	18096	19101	20106
1700	1135	2270	3405	4540	5675	6809	7944	9079	10214	11349	12484	13619	14754	15889	17024	18158	19293	20428	21563	22698
1800	1272	2545	3817	5089	6362	7634	8906	10179	11451	12723	13996	15268	16540	17813	19085	20358	21630	22902	24175	25447
1900	1418	2835	4253	5671	7088	8506	9924	11341	12759	14176	15594	17012	18429	19847	21265	22682	24100	25518	26935	28353
2000	1571	3142	4712	6283	7854	9425	10996	12566	14137	15708	17279	18850	20420	21991	23562	25133	26704	28274	29845	31416
2100	1732	3464	5195	6927	8659	10391	12123	13854	15586	17318	19050	20782	22513	24245	25977	27709	29441	31172	32904	34636
2200	1901	3801	5702	7603	9503	11404	13305	15205	17106	19007	20907	22808	24709	26609	28510	30411	32311	34212	36113	38013
2300	2077	4155	6232	8310	10387	12464	14542	16619	18696	20774	22851	24929	27006	29083	31161	33238	35315	37393	39470	41548
2400	2262	4524	6786	9048	11310	13572	15834	18096	20358	22619	24881	27143	29405	31667	33929	36191	38453	40715	42977	45239
2500	2454	4909	7363	9817	12272	14726	17181	19635	22089	24544	26998	29452	31907	34361	36816	39270	41724	44179	46633	49087
2600	2655	5309	7964	10619	13273	15928	18583	21237	23892	26546	29201	31856	34510	37165	39820	42474	45129	47784	50438	53093
2700	2863	5726	8588	11451	14314	17177	20039	22902	25765	28628	31491	34353	37216	40079	42942	45804	48667	51530	54393	57256
2800	3079	6158	9236	12315	15394	18473	21551	24630	27709	30788	33866	36945	40024	43103	46181	49260	52339	55418	58496	61575
2900	3303	6605	9908	13210	16513	19816	23118	26421	29723	33026	36329	39631	42934	46236	49539	52842	56144	59447	62749	66052
3000	3534	7069	10603	14137	17671	21206	24740	28274	31809	35343	38877	42412	45946	49480	53014	56549	60083	63617	67152	70686

VALVE SELECTION GRAPH



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VALVE SELECTION FROM GRAPH

All the relevant information has been condensed into one graph to enable valve selection to be simple and easy and at the same time to allow flexibility to the designer to move within certain parameters which eventually allows the most suited and economically viable valve to be selected.

IMPORTANT NOTE: The graph is based on vacuum breaking and limiting vacuum to 0.34 bar (5 psi) below atmospheric. It is not good practice to go below 0.69 bar (10 psi) absolute (0.303bar (4.4 psi) differential in pipeline at sea level). The graph allows for change in altitude and hence change in atmospheric pressure and is based on the assumption that more than one valve per section is used for vacuum protection and venting.

ACTUAL SELECTION (GRAVITY OR PUMPED PIPELINES)

Selection is based on the premise that pipelines are generally filled at a slower rate than they are drained, scoured or at which separation occurs (a maximum fill/ drain ratio of 1:1).

1. Determine the maximum drainage rate in m/s either for scouring, pipe rupture or column separation for a particular pipeline section.
2. Move vertically on the graph from the m/s point and move horizontally from the pipe size finding the intersecting point.
3. This point should fall within the operating band of a particular valve size. Consideration must be given to the fact that the upper portion of the band approaches - 0.34 bar (5 psi) and the lower portion - 0.1 bar (1.45 psi) for each valve size, this allows the designer to see at a glance if the valve is too close to It's operating limits and to select the next valve size.

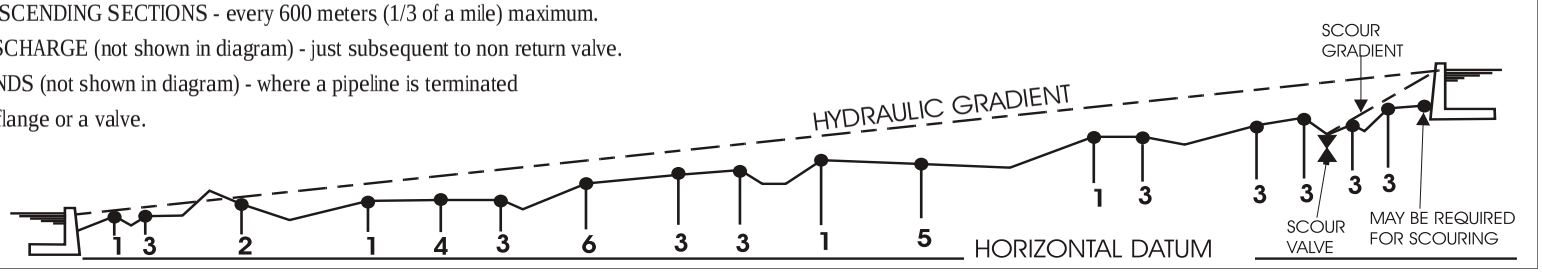
EXAMPLE OF VALVE SIZING (ASSUMMING AN INDIVIDUAL SECTION)

A ø 400mm (16") pipeline draining at 377l/sec which equates to 3m/sec (10ft/s) what valve size should be selected?

From the 3m/sec (10ft/s) point, move vertically until the ø 400mm (16") pipe size horizontal line is intersected. This places the intersection point squarely in the centre of the operating band of a DN80 (3") Vent -O- Mat RGX valve. But, if for example, the drainage rate is 503l/sec which equates to 4m/sec (13.2ft/s), the valve would be operating on it's limit and it may be prudent to change to a DN100 (4") Vent -O- Mat RGX.

VALVE POSITIONING

1. ON APEX POINTS (relative to hydraulic gradient).
2. 5 METERS (16 FEET) BELOW APEX POINTS FORMED BY INTERSECTION OF PIPELINE AND HYDRAULIC GRADIENT - i.e. where pipeline siphoning over gradient, a sewage air release valve positioned on the apex would break the siphon. If positioning on apex is required a modified VENT -O- MAT Series RGX can be supplied.
3. NEGATIVE BREAKS (increase in downward slope or decrease in upward slope).
4. LONG HORIZONTAL SECTIONS - every 600 meters (1/3 of a mile) maximum.
5. LONG ASCENDING SECTIONS - every 600 meters (1/3 of a mile) maximum.
6. LONG DESCENDING SECTIONS - every 600 meters (1/3 of a mile) maximum.
7. PUMP DISCHARGE (not shown in diagram) - just subsequent to non return valve.
8. BLANK ENDS (not shown in diagram) - where a pipeline is terminated by a blind flange or a valve.



VENT-O-MAT®

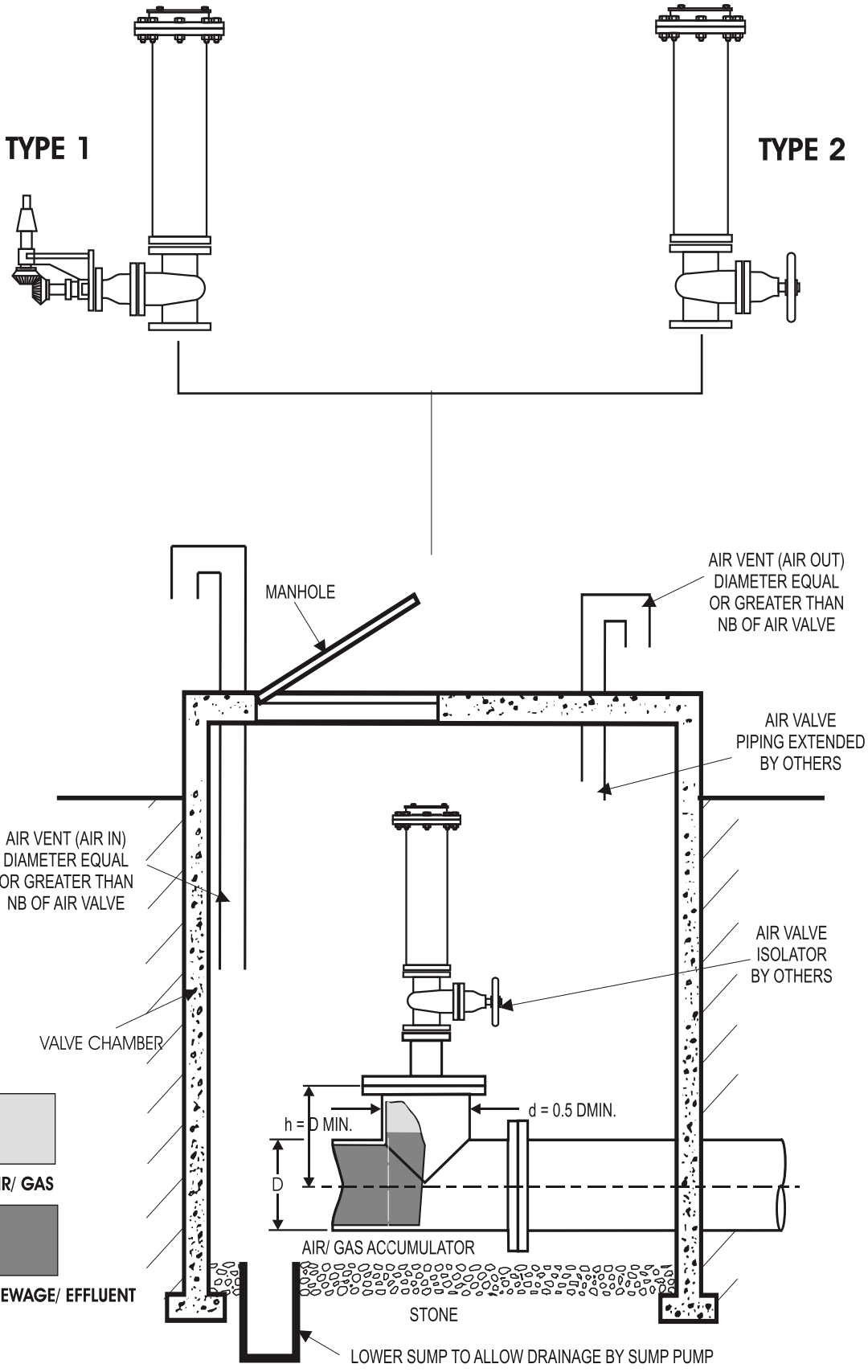
Series RGX

SELECTION & POSITIONING

VENT-O-MAT®

Series RGX

RECOMMENDED INSTALLATION ARRANGEMENTS



TYPICAL VALVE CHAMBER

information subject to change without prior notice

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